REMARKS

Applicants have amended the identified portions of the specification to more clearly describe the different aspects of the invention. No new matter has been added.

Applicants have also added new claims 31-33.

Applicants have amended claims 1, 2, 4-10, 12-14, 16-21, and 23-30 to more clearly claim that which is considered the invention. No inference or presumption should be drawn from these amendments as to the patentability of the original claims.

VERSION OF THE DETAILED DESCRIPTION WITH MARKED-UP CHANGES

In the paragraph in page 3, lines 20-28:

Figure 1 illustrates a block diagram of a configuration of devices in which one embodiment of the invention may be employed. A first device (transmitter) 102 transmits serial data signals to a second device (receiver) 104 over a transmission medium 106. The transmission medium may be susceptible to noise or interference which may cause jitter and/or frequency offsets in the transmitted signal. The second device includes a data recovery or error correction component 108 embodying one or more aspects of the invention to improve data extraction.

In the paragraphs starting in page 4, line 34, and ending in page 5, line 15:

The edge detector 204 attempts to find the location of the edges (i.e. low-to-high or high-to-low transitions) between data bits. In one implementation, the edge detector 204 extracts edge locations from the samples by XORing (performing exclusive OR logic operations) on adjacent data samples. For the exemplary embodiment shown in Fig. 2, six samples serve as inputs to the edge detector 204 and the edge detector 204 generates six outputs, each output being obtained

by XORing adjacent samples. For instance, in Fig. 3 for bit3, XORing of sample pairs d4 (between bit2 and bit3) and d5, d5 and d6, d6 and d1, d1 and d2, d2 and d3, and d3 and d4 (between bit3 and bit4) would provide the six outputs for the edge detector 204.

Throughout this description, the symbol ⊕ is employed to refer to a XORing (exclusive OR) operation or any collection of operations which provide an equivalent result.

For each cycle, the edge detector 204 generates the location where the edges occurred between samples. For example, if data sample d3 was logic low (0), and data sample d4 was logic high (1), the edge detector would indicate an edge occurred between d3 and d4.

A decision matrix component 206 is coupled to the edge detector 204 to receive the outputs from the edge detector 204 and select one of the sample points according to a predefined decision algorithm, table, or matrix.

VERSION OF THE CLAIMS WITH MARKED-UP CHANGES

1. (Amended) A method comprising:

receiving a serial data stream;

sampling each data unit in the data stream N times to obtain multiple data samples per data unit;

detecting edge transitions between adjacent data samples; and

selecting a first data sample, from among the multiple data samples and representative of the current data unit, based on the location of edge transitions over the current and previous data cycles and the location of ~~the~~ an ideal data sample to perform data recovery.

2. (Amended) The method of claim 1 wherein the selected first data sample is determined by the edge transition in the previous or current data cycles which is closest to the ideal data sample.

3. (Not Amended)

4. (Amended) The method of claim 1 wherein the ideal data sample is within the current data unit cycle and a distance of N samples from the previously selected data sample.

5. (Amended) The method of claim 1 wherein selecting the data sample includes,

selecting the first data sample to lie in the direction of the mid-point between the detected edge transition and the next expected edge transition and a distance of N-1, N, or N+1

samples from ~~the~~ a previously selected data sample, whichever is closest to the mid-point.

6. (Amended) The method of claim 1 wherein selecting ~~a~~ the first data sample based on the location of edge transitions over ~~two~~ the current and previous data unit cycles includes selecting a data sample based on 2*N consecutive data samples across the current data unit cycle and the previous data unit cycle.

7. (Amended) The method of claim 1 wherein if no edge transitions are detected the selected first data sample is the ideal data sample.

8. (Amended) The method of claim 1 wherein if only one edge transition is detected, that edge transition determines the ~~next~~ selected first data sample.

9. (Amended) The method of claim 1 wherein if multiple edge transitions are detected and all correspond to the same data sample, then that data sample is selected as the first data sample.

10. (Amended) The method of claim 1 wherein if multiple data edge transitions are detected and they correspond to different data samples, then the selected first data sample is the ideal data sample.

11. (Not Amended)

12. (Amended) The method of claim 1 wherein in selecting the first data sample, as between two equally likely data sample

locations, the data sample location most recently selected in previous cycles is chosen.

13. (Amended) An apparatus comprising:

a sampling device to sample ~~each~~ data ~~unit~~ units of a serial data stream N times at different points in each data unit, where N is an integer value;

an edge detector coupled to the sampling device to detect edge transitions between consecutive data unit samples; and

a selection controller coupled to the edge detector to receive ~~the outputs~~detected edge transitions from the edge detector and select a first data sample to represent the current data unit according a predefined decision algorithm for data correction employing the current and previous data unit cycles and ~~the~~ an ideal current data sample.

14. (Amended) The apparatus of claim 13 wherein the ideal current data sample is located within the current data unit cycle and a distance of N samples from a~~the~~ previously selected second data sample in the previous data unit cycle.

15. (Not Amended)

16. (Amended) The apparatus of claim 13 wherein the selection controller selects the first data sample based on ~~corresponding to the~~a first edge transition ~~in~~ for either the previous or current data cycles, whichever edge transition is closest to the ideal current data sample.

17. (Amended) The apparatus of claim 13 wherein the selection controller selects the first data sample to lie in the direction of the mid-point between ~~the~~ a detected first edge

transition and ~~the~~ a next expected edge transition and a distance of -1, 0, or +1 samples from the ideal data sample location, whichever is closest to the mid-point.

18. (Amended) The apparatus of claim 13 wherein if no edge transitions are detected by the edge detector, the selection controller selects the ideal data sample location to obtain the first data sample.

19. (Amended) The apparatus of claim 13 wherein if only one edge transition is detected by the edge detector then the selection controller selects ~~a~~ the first data sample ~~which lies~~ to lie in the direction of the mid-point between ~~the~~ a detected first edge transition and ~~the~~ a next expected edge transition and a distance of -1, 0, or +1 samples from the ideal data sample location, whichever is closest to the mid-point.

20. (Amended) The apparatus of claim 13 wherein if multiple edge transitions are detected by the edge detector and all transitions correspond to the same first data sample, then the selection controller selects that first data sample as the next data sample.

21. (Amended) The apparatus of claim 13 wherein if multiple data edge transitions are detected by the edge detector and they correspond to different data samples, then the selection controller selects the first data sample to ~~corresponding~~ correspond with to the ideal data sample location.

22. (Not Amended)

23. (Amended) The apparatus of claim 13 wherein, as between two equally likely data sample locations, the selection controller selects the first data sample location that was most recently selected in previous cycles.

24. (Amended) A machine-readable medium having one or more instructions to perform data recovery, which when executed by a processor, causes the processor to perform operations comprising:

sampling each data unit in a data stream N times, where N is an integer value, at different locations along ~~the~~ each data unit, to obtain multiple data samples per data unit;

detecting edge transitions between adjacent data samples; and

selecting a first data sample representative of the current data unit based on the location of edge transitions over the previous and current data ~~cycles~~ units and the location of ~~the~~ an ideal current data sample to perform data recovery.

25. (Amended) The machine-readable medium of claim 24 wherein the representative first data sample is selected to lie in the direction of the mid-point between ~~the~~ a first detected edge and ~~the~~ a next expected edge and yet is adjacent to, or equal to, the ideal current data sample location within the current data unit cycle.

26. (Amended) The machine-readable medium of claim 24 wherein if no edge transitions are detected the selected first data sample corresponds to the same location as the ideal current data sample.

27. (Amended) The machine-readable medium of claim 24 wherein if only one edge transition is detected, then that edge transition determines the ~~next~~ selected first data sample to be a sample which lies in the direction of the mid-point between the detected edge transition and ~~the~~ a next expected edge transition and a distance of -1, 0, or +1 samples from the ideal current data sample location, whichever is closest to the mid-point.

28. (Amended) The machine-readable medium of claim 24 wherein if multiple edge transitions are detected and all correspond to the same data sample, then that data sample is selected as the first data sample.

29. (Amended) The machine-readable medium of claim 24 wherein if multiple data edge transitions are detected and they correspond to different edge transitions, then the selected first data sample is at the same location as the ideal current data sample.

30. (Amended) The machine-readable medium of claim 24 wherein selecting the first data sample, as between two equally likely data sample locations, the data sample location most recently selected in previous cycles is chosen as the first data sample location.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: January 28, 2002

Julio Loza
Reg. No. 47,758

12400 Wilshire Boulevard, Seventh Floor
Los Angeles, California 90025
(714) 557-3800

CERTIFICATE OF MAILING/TRANSMISSION (37 CFR 1.8A)

I hereby certify that this correspondence is, on the date shown below, being:

MAILING

☐: *deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.*

FACSIMILE

☒: *transmitted by facsimile to at the Patent and Trademark Office.*

Date: January 28, 2002

Pat Sullivan 1/28/02

Pat Sullivan ***Date***